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# APPENDIX A

# NASA UNMANNED SPACECRAFT DECONTAMINATION POLICY

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PART II

MANAGEMENT MANUAL

ADMINISTRATIVE REGULATIONS AND PROCEDURES

CHAPTER 4

NUMBER 4-4-1

EFFECTIVE DATE Sept. 9, 1963

**SUBJECT:** NASA UNMANNED SPACECRAFT DECONTAMINATION POLICY

1. PURPOSE

This Instruction establishes NASA policy and requirements concerning decontamination and sterilization of unmanned spacecraft for purposes of planetary quarantine.

2. APPLICABILITY

This Instruction is applicable to NASA Headquarters and field installations.

3. DEFINITIONS

For the purpose of this Instruction, the following definitions will apply:

a. The term "sterilization" is defined as the process by which living organisms are removed or killed to the extent that they are no longer detectable in standard culture media in which they have been previously demonstrated to proliferate.

b. The term "a clean room" means a room in which the facility and procedures will reduce the rate of settling of particles from the air in accordance with established standards (see paragraph 8).

4. SCOPE

The provisions of this Instruction are applicable to unmanned spacecraft which are intended to, or may, land on the moon or one of the planets.

5. RESPONSIBILITY FOR IMPLEMENTATION

a. Office of Space Sciences, NASA Headquarters. The Director of Space Sciences, NASA Headquarters, is responsible for:

(1) Overall administration of the NASA unmanned spacecraft decontamination and sterilization policy, and

(2) Certification to the Administrator of the sterility of the spacecraft, or lack thereof, prior to launch.

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Delegations of specific responsibilities for implementation of this policy are set forth in subparagraphs b and c.

b. Bioscience. The Director of Bioscience Programs is responsible for:

(1) Developing and defending the biological rationale and scientific bases for the NASA decontamination and sterilization policy.

(2) Developing, proving and publishing techniques of sterilizing spacecraft hardware (heat, chemicals, radiation, etc.).

(3) Prescribing probabilities of planetary contamination for the various sterilization techniques and stating "biological reliability" for those techniques.

(4) Performing biological assays of products and procedures submitted by the Office of Lunar and Planetary Programs (Code SL).

(5) Approving equipment and procedures proposed by the Office of Lunar and Planetary Programs for sterilizing unmanned spacecraft and for maintaining such sterility through handling and launch.

(6) Serving as monitor throughout all phases of unmanned spacecraft manufacture, checkout, and launch to ensure that the requisite sterility is achieved and maintained throughout, and that the spacecraft is decontaminated for launch.

(7) Submitting, to the Director of Space Sciences, the certification of sterility of the spacecraft prior to launch.

c. Lunar and Planetary. The Director of Lunar and Planetary Programs is responsible for:

(1) Taking the necessary precautions to ensure that unsterile spacecraft (e.g., fly-by-mission not intended to land on a planet) will not inadvertently impact and contaminate a planet.

(2) Developing "sterilizable" materials, components, and spacecraft and performing reliability assessments and quality assurance.

(3) Proposing sterilization facilities, operating procedures and techniques to the Office of Bioscience Programs (Code SB) for approval.

(4) Developing, building and operating:

(a) The equipment in which the unmanned spacecraft is sterilized,

(b) A microbiological barrier to prevent recontamination within the earth's atmosphere during launch.

(5) Performing all sterilization operations.

(6) Delivering items of equipment to field installation or contractors designated by the Office of Bioscience Programs for their biological assay in verifying the effectiveness of proposed spacecraft sterilization procedures.

6. POLICY

a. Moon

(1) The NASA policy is based on acceptance of the scientific opinion that lunar surface conditions would mitigate against reproduction of known terrestrial microorganisms and that, if subsurface penetration of viable organisms were to be caused by spacecraft impact, proliferation would remain highly localized.

(2) It is the NASA policy to protect the moon from widespread or excessive contamination until sufficient information has been obtained concerning the moon to ensure that scientific studies will not be jeopardized.

b. Planets

(1) The NASA acknowledges the body of data and theory underlying the possibility of life and life-related molecules on the planets and the importance of scientific investigations of extraterrestrial life forms. It is recognized that the contamination of the planets with terrestrial microorganisms would pose a potential hazard to these scientific investigations. It is also realized that more must be known concerning life forms of the planets before the potential effects of returning extraterrestrial matter to earth can be evaluated.

(2) It is the policy of the NASA to prevent the biological contamination of the planets until sufficient information has been obtained concerning the planets to ensure that biological studies will not be jeopardized and that no hazard to earth exists.

7. REQUIRED PROCEDURES

a. Unmanned Lunar-landing Spacecraft. The following procedures for the decontamination of unmanned lunar-landing spacecraft will apply:

(1) The spacecraft will be assembled in clean rooms at specified levels of assembly (see paragraph 8).

(2) Effective sporicidal agents will be used when and where appropriate to reduce the microbial load on exposed surfaces.

(3) The final assembly will be wrapped and shipped to the launch site and handled, during preparation for launch, in a manner that will prevent the accumulation of dirt, dust, and microorganisms.

b. Unmanned Planet-landing Spacecraft. The following procedures for the decontamination of unmanned planet-landing spacecraft will apply:

(1) The lander will be assembled in clean rooms at specified levels of assembly (see paragraph 8).

(2) The landing assembly will be subjected to an approved sterilization procedure.

(3) The landing assembly will be enclosed in a bacteriological barrier to maintain cleanliness and sterility. After decontamination, the enclosure will not be opened within any portion of the earth's atmosphere which might recontaminate the landing assembly.

8. PROCEDURAL MANUALS

NASA will collect and maintain current information relevant to all aspects of spacecraft decontamination and sterilization problems; establish standard detailed procedures and techniques to implement the unmanned spacecraft decontamination and sterilization policy; and establish a qualified products list and spacecraft assembly procedures. These procedures and

requirements will be promulgated in a series of NASA management handbooks for use by NASA installations.

9. REPORTS

Special, periodic, and final reports covering the decontamination and sterilization of unmanned spacecraft will be prepared by the Office of Space Sciences. Copies of such reports will be furnished to NASA management and the scientific and technical community as a whole.

Hugh L Dryden
Deputy Administrator